

Developing a Pricing Signal

5/12/2010

Version 3.0

1 Descriptions of Function

This use case will show how price signals are calculated and sent to the Customers and their devices.

Within the real-time pricing system, a pricing signal is produced every 5 minutes and communicated to the customer and customer's demand response devices for appropriate consumption behavior. As can be seen in the real-time pricing diagram, the computation of the 5 minutes pricing signal is the function of the Smart Grid Dispatch. This Use Case describes how the Utility will produce a 5 minutes pricing signal and how it is communicated through the real-time pricing system.

1.1 Function Name

Pricing Model

1.2 Function ID

Identification number of the function

1.3 Brief Description

Within the real-time pricing system, a pricing signal is produced every 5 minutes and communicated to the customer and customer's demand response devices for appropriate consumption behavior. As can be seen in the real-time pricing diagram, the computation of the 5 minutes pricing signal is the function of the Smart Grid Dispatch. This Use Case describes how the Utility will produce a 5 minutes pricing signal and how it is communicated through the real-time pricing system.

1.4 Narrative

Studies indicate that customers who understand the cost of electricity reduce their usage, especially when prices are high. The RTP system (real-time pricing system) will produce price signals every 5 minutes and will communicate this pricing to every customer and to the demand response

devices at the customer premise. In order to produce this price signal, the new Smart Grid Dispatch system will take its inputs from many existing systems, including the AMI system.

The **Regional Transmission Organization (RTO)** will provide real-time and day-ahead pricing data that will be interfaced to the SG Dispatch system. The **Distribution Management system (DMS)** will also be interfaced to the SG Dispatch System in order to provide data regarding the state of the distribution network. The **Meter Data Management (MDM)** system will provide validated usage information to the **SG Dispatch** system (for pre-billing purpose). The **Smart Grid Dispatch** will also obtain inputs from the customer (via the Facility EMS/Gateway) in the form of the customer's profile, the appliances usage and the premise usage. The **Customer Information System (CIS)** will be interfaced with the **Smart Grid Dispatch** system and data synchronization will take place between the two systems. The **Smart Grid Dispatch** system will take those inputs and produce a 5 minute price signal that will be sent to customers and the smart devices at their premises. Also, the **Smart Grid Dispatch** system will compute pricing and usage information that will be provided to the new **Utility Calculation Engine** which will prepare billing to be communicated to the **Customer Information System (CIS)** and to the customer portal.

This solution provides interactions with customers by: conveying frequent price signal information, communicating the results of consumption behavior in small time increments via the customer portal and also allowing the customer to set up a profile and let the system make recommendations or take actions. The information regarding customer behavior and their reactions towards pricing signals will be invaluable inputs to the utility and provide enhanced planning capabilities for the future.

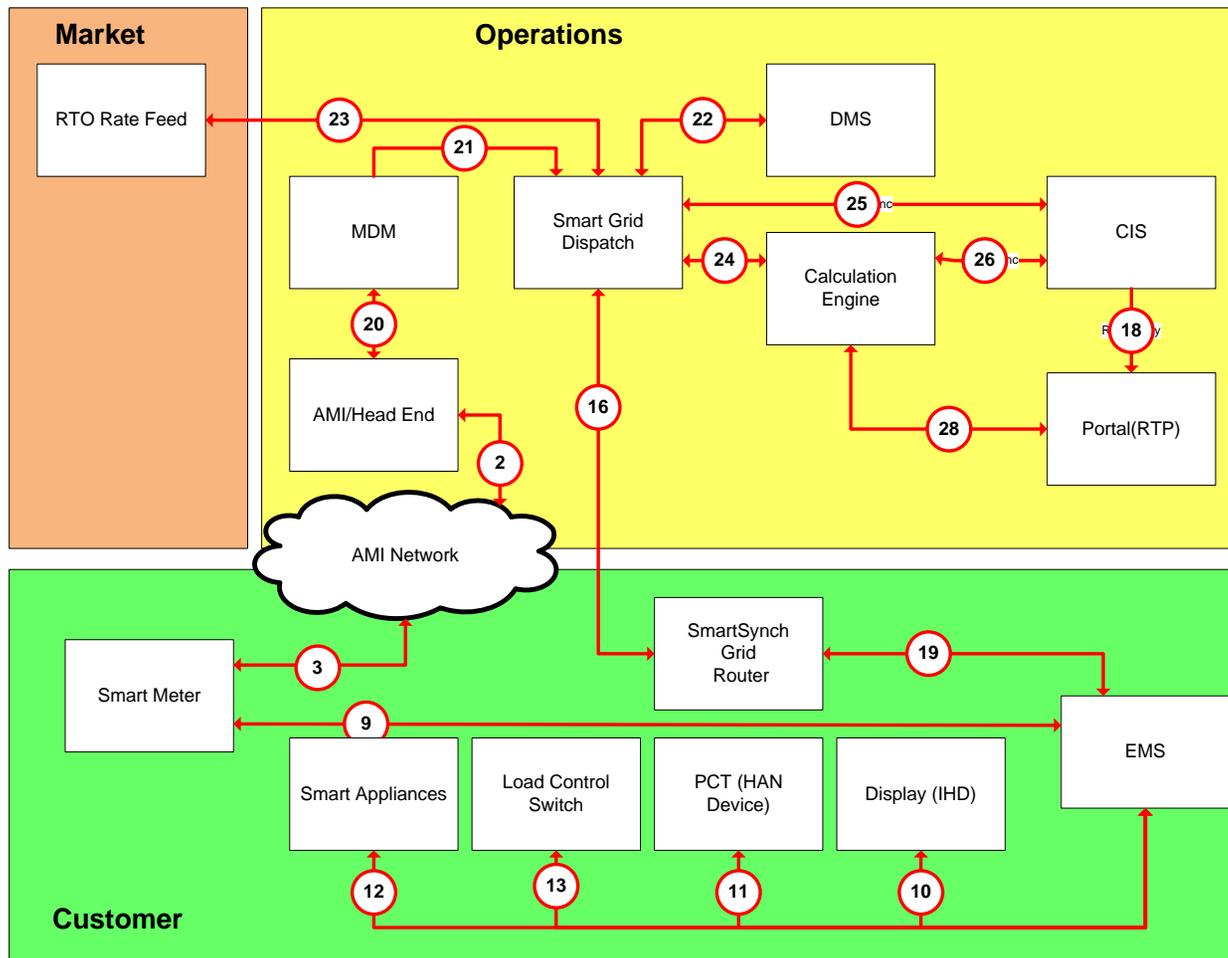


Figure 1-1
Context Diagram for Real-Time Pricing

1.5 Actor (Stakeholder) Roles

<i>Grouping (Community)</i>		<i>Group Description</i>
<i>Actor Name</i>	<i>Actor Type (person, organization, device, system, or subsystem)</i>	<i>Actor Description</i>
Calculation Engine (Utility)	System	Software-based system that performs billing calculations based on electricity usage for the real-time pricing solution
AMI Head End	System	The AMI Head-End is the back office system than controls the Advanced Metering Infrastructure.
CIS (MACSS)	System	Customer Information System internally called MACSS that is the system of record for customer data and billing.
Customer Portal	System	Interactive Web-site that is accessible via the internet that enables the exchange and display of information for the customer.
DMS	System	Distribution Management System (includes following sub-systems D-SCADA, PowerFlow, VVC)
EMS (customer)	Device	A logical or physical device typically located at the customer facility that acts as a home electricity control center. The EMS is typically connected to the HAN and sends/receives information from various communications means depending on the customer scenario.
EVSE (Electric Vehicle Supply Equipment)	Device	Electric Vehicle Supply Equipment manufacturers are delivering Smart charging stations for electric vehicles. These smart charging stations will typically be located at customers' premises, or at other private and public parking facilities.
EVSE Radio	Device	The radio with the EVSE that sends and receives information through the HAN

<i>Grouping (Community)</i>		<i>Group Description</i>
<i>Actor Name</i>	<i>Actor Type (person, organization, device, system, or subsystem)</i>	<i>Actor Description</i>
IHD (In-Home Display)	Device	In-Home Display presents basic information to the customer such as consumption data, price information or demand response signals.
IHD Radio	Device	The radio with the IHD that receives and sends the data to the HAN.
Internet Gateway	Device	Equipment at customers' premise that enables internet access.
Load Control Switch	Device	Electric switch that can be remotely commanded to open or close.
Load Control Switch Radio	Device	The radio that sends and receives data between the controller and the switch
MDM	System	Meter Data Management that performs VEE (validation, estimation, (please complete))
NIC - ESI	Device	HAN side of the Network Interface Card within the meter. (Energy Services Interface). Device and software that permits applications such as load control device or in-home display to receive information in a secure fashion.
NIC - ESP	Device	AMI side of the network interface card within the smart meter.
PCT (Programmable Control Thermostat)	Device	Device on the Home Area Network that is programmable and controllable.
PCT Radio	Device	The radio that sends and receives data between the HAN and the PCT
PEV	Device	Plug-In Electric Vehicle

<i>Grouping (Community)</i>		<i>Group Description</i>
<i>Actor Name</i>	<i>Actor Type (person, organization, device, system, or subsystem)</i>	<i>Actor Description</i>
RTO Wholesale Market	Organization	Regional Transmission Operator in charge of bulk electricity markets (such as PJM)
Smart Appliance	Device	Smart Appliances can react to remote management, whether to price, grid integrity, or other energy management signaling.
Smart Appliance Radio	Device	The radio that sends and receives data between the smart appliance and the HAN
Smart Grid Dispatch Engine	System	Central system within the real-time pricing solution to be developed for the Utility.
SmartSync Grid Router	System	The SmartSync Grid Router is located at the customer premise and provides 5 minutes price signals to the customer EMS (part of the real-time-pricing solution)

1.6 Information exchanged

<i>Information Object Name</i>	<i>Information Object Description</i>
Day ahead pricing signal	Based on historical data and trends, the RTO provides a forecast for next day pricing.
Real-time pricing (bulk)	The RTO communicates the real-time pricing information of bulk electricity market.
Real time pricing signal (customer)	Pricing information provided to customer and produced every 5 minutes.
Actual Load	Measurement of the power consumption at a specific time
Electricity Usage Data	Customer premise electricity usage communicated via the HAN and the Facility Gateway. This usage data is for operational use.

<i>Information Object Name</i>	<i>Information Object Description</i>
Verified Electricity Usage Data	Electricity usage that comes from the meter via the AMI network and the Meter Data Management system, which is the only approved system for metering and billing.
Smart Appliance Usage	Data produced by the Smart Appliance
Customer Profile	Aggregate of customer smart devices and electricity consumption preferences usually managed by the customer EMS. Profiles can track preferred response to a critical price peak or general choices between comfort and economy. Profile also includes customer devices that can be addressed by demand response system
Distribution Pricing Adder	Data acquired from the DMS about status of the distribution network which contributes to the pricing equation within the Smart Grid Dispatch
Data for Pricing	Typically includes data about usage and rate at the 5 minute interval and price plans.
5 Minute Pricing Signal	Information about electricity price sent to customer and smart devices every 5 minutes.
Calculated 5 Minute Pricing Signal	Information about electricity price sent to customer and smart devices every 5 minutes.
Billing Determinant	Data that is ready to be processed by billing system.
(Customer) Billing data	Data about customer bill.
Data elements for Device Commands	Typically produced in a Machine to machine (M2M) communication scheme, this data generates some commands or action by the receiving device.
Data elements for Device Commands for In-Home Display	Typically produced in a Machine to machine (M2M) communication scheme, this data is for display only in IHD
Communications Acknowledgement	Very small amount of data that confirms that a communication was received error free.

<i>Information Object Name</i>	<i>Information Object Description</i>

1.7 Activities/Services

<i>Activity/Service Name</i>	<i>Activities/Services Provided</i>
Pricing Information	Customer receives updated price information every 5 minutes.
Detailed Billing	Detailed information about customer usage, pricing and billing provided via portal.
Automatic response to pricing signal	Depending on customer profile, pricing signals will generate specific automated responses (such as load curtailment)

1.8 Contracts/Regulations

<i>Contract/Regulation</i>	<i>Impact of Contract/Regulation on Function</i>

<i>Policy</i>	<i>From Actor</i>	<i>May</i>	<i>Shall Not</i>	<i>Shall</i>	<i>Description (verb)</i>	<i>To Actor</i>

<i>Constraint</i>	<i>Type</i>	<i>Description</i>	<i>Applies to</i>

2 Step by Step Analysis of Function

Describe steps that implement the function. If there is more than one set of steps that are relevant, make a copy of the following section grouping (Steps to implement function, Preconditions and Assumptions, Steps normal sequence, Post-conditions) and provide each copy with its own sequence name.

2.1 Steps to implement function – Name of Sequence

Developing a Pricing Signal

2.1.1 Preconditions and Assumptions

<i>Actor/System/Information/Contract</i>	<i>Preconditions or Assumptions</i>
Customer	Customer inputs preferences upon signing up for the program
EMS (customer)	Customer preferences are loaded in the EMS
Internet Gateway	Internet Gateway is installed and functional at the premise
HAN Devices	HAN Devices have been commissioned and registered
Smart Grid Dispatch	New SG dispatch system is fully functional as specified
(Utility) Calculation engine	This new system is fully functional as specified

2.1.2 Steps – Name of Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
#	<i>Triggering event? Identify the name of the event.¹</i>	<i>What other actors are primarily responsible for the Process/Activity? Actors are defined in section 1.5.</i>	<i>Label that would appear in a process diagram. Use action verbs when naming activity.</i>	<i>Describe the actions that take place in active and present tense. The step should be a descriptive noun/verb phrase that portrays an outline summary of the step. "If ...Then...Else" scenarios can be captured as multiple Actions or as separate steps.</i>	<i>What other actors are primarily responsible for Producing the information? Actors are defined in section 1.5.</i>	<i>What other actors are primarily responsible for Receiving the information? Actors are defined in section 1.5. (Note – May leave blank if same as Primary Actor)</i>	<i>Name of the information object. Information objects are defined in section 1.6</i>	<i>Elaborate architectural issues using attached spreadsheet. Use this column to elaborate details that aren't captured in the spreadsheet.</i>	<i>Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.</i>
1.1	Normal Planning Operations	RTO Wholesale Market	Day Ahead Pricing Signal	RTO Wholesale Markets delivers a Day Ahead Pricing Signal to the Smart Grid Pricing Engine	RTO Wholesale Market	Smart Grid Pricing Engine	Day Ahead Pricing Signal	24 hours worth of 5 minute pricing signals	
1.2	Normal Planning Operations	RTO Wholesale Market	Real Time Pricing Signal	RTO Wholesale Markets delivers a Real Time Pricing Signal to the Smart Grid Dispatch Engine	RTO Wholesale Market	Smart Grid Dispatch Engine	Real Time Pricing Signal	Simple changes updated at ~ 5 minute intervals	
1.3.1	NIC - ESI delivers interval electricity usage	NIC - ESI	Actual Load	NIC - ESI delivers the Actual Load to the EMS	NIC - ESI	EMS (customer)	Actual Load	(not going through AMI system)	
1.3.2		EMS (customer)	Actual Load	EMS delivers the Actual Load to the Internet Gateway	EMS (customer)	Internet Gateway	Actual Load		

¹ Note – A triggering event is not necessary if the completion of the prior step – leads to the transition of the following step.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.3.3		Internet Gateway	Actual Load	Internet Gateway delivers the Actual Load to the Smart Grid Dispatch Engine	Internet Gateway	Smart Grid Dispatch Engine	Actual Load		
1.4		NIC - ESI	Actual Load delivered to NIC - ESP	NIC – ESI delivers Actual Load Data to the NIC - ESP	NIC – ESI	NIC - ESP	Actual Load		
1.5.1	NIC - ESI transmits electricity usage through AMI system	NIC - ESP	NIC - ESP delivers Electricity Usage Data	NIC - ESP delivers Electricity Usage Data to the AMI Network	NIC - ESP	AMI Network	Electricity Usage Data	Use AMI Network Use Case	
1.5.2	NIC - ESI transmits electricity usage through AMI system	AMI Network	AMI Network delivers Electricity Usage Data	AMI Network delivers Electricity Usage Data to the AMI Head End	AMI Network	AMI Head End	Electricity Usage Data	Use AMI Network Use Case	
1.5.3	AMI System delivers Electricity usage data to MDM	AMI Head End	The AMI Head End delivers the Electricity Usage Data	The AMI Head End delivers the Electricity Usage Data to the MDM.	AMI Head End	MDM	Electricity Usage Data		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.6		MDM	Verify Electricity Usage Data	MDM verifies Electricity Usage Data	MDM	MDM	Verified Electricity Usage Data		
1.7	MDM System delivers verified usage data to SG Dispatch engine	MDM	Electricity Usage Data is verified	MDM delivers Verified Electricity Usage Data to the Smart Grid Dispatch Engine	MDM	Smart Grid Dispatch Engine	Verified Electricity Usage Data		
1.8.1		Smart Appliance Device Controller	Smart Appliance Device Controller delivers Smart Appliance Usage	Smart Appliance Device Controller delivers Smart Appliance Usage to the Smart Appliance Radio	Smart Appliance Device Controller	Smart Appliance Radio	Smart Appliance Usage		
1.8.2		Smart Appliance Radio	The Smart Appliance Radio delivers the Smart Appliance Usage	The Smart Appliance Radio delivers the Smart Appliance Usage to the EMS	Smart Appliance Radio	EMS (customer)	Smart Appliance Usage		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.8.3		EMS (customer)	EMS (customer) delivers Smart Appliance Usage	EMS (customer) delivers Smart Appliance Usage to the Internet Gateway	EMS (customer)	Internet Gateway	Smart Appliance Usage		
1.8.4		Internet Gateway	Internet Gateway delivers Smart Appliance Usage Data	Internet Gateway delivers Smart Appliance Usage Data to the Smart Grid Dispatch Engine	Internet Gateway	Smart Grid Dispatch Engine	Smart Appliance Usage Data		
1.9		DMS	DMS delivers Distribution Pricing	DMS delivers Distribution Pricing Adder to the Smart Grid Dispatch Engine	DMS	Smart Grid Dispatch Engine	Distribution Pricing Adder		
1.10		Smart Grid Dispatch Engine	Smart Grid Dispatch Engine delivers price info	Smart Grid Dispatch Engine delivers price info to the Utility Calculation Engine	Smart Grid Dispatch Engine	Utility Calculation Engine	Data for Pricing		
1.11		Smart Grid Dispatch Engine	Smart Grid Dispatch Engine delivers 5 Minute Pricing Signal	Smart Grid Dispatch Engine delivers 5 Minute Pricing Signal to the SmartSynch Grid Router	Smart Grid Dispatch Engine	SmartSynch Grid Router	5 Minute Pricing Signal		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.12		Calculation Engine (Utility)	Calculation Engine (Utility) calculates a 5 Minute Pricing signal	Calculation Engine (Utility) calculates a 5 Minute Pricing signal and delivers it to the Utility – Customer Portal	Calculation Engine (Utility)	Utility – Customer Portal	Calculated 5 Minute Pricing Signal		
1.13		Calculation Engine (Utility)	Calculation Engine (Utility) calculates Billing Determinant	Calculation Engine (Utility) calculates Billing Determinant and delivers to CIS (MACSS)	Calculation Engine (Utility)	CIS (MACSS)	Billing Determinant		
1.14		CIS (MACSS)	CIS (MACSS) calculates customer billing and delivers	CIS (MACSS) calculates (Customer) Billing Data and delivers to Utility – Customer Portal	CIS (MACSS)	Utility – Customer Portal	(Customer) Billing Data		
1.15.1		Smart Grid Dispatch Engine	Smart Grid Dispatch Engine delivers 5 Minute Pricing Signal	Smart Grid Dispatch Engine delivers 5 Minute Pricing Signal to the SmartSync Grid Router	Smart Grid Dispatch Engine	SmartSync Grid Router	5 Minute Pricing Signal		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.15.2		SmartSync Grid Router	SmartSync Grid Router delivers 5 Minute Pricing Signal	SmartSync Grid Router delivers 5 Minute Pricing Signal to the EMS (customer)	SmartSync Grid Router	EMS (customer)	5 Minute Pricing Signal		
1.16		EMS (customer)	The EMS (customer) inputs the 5 Minute Pricing Signal and creates Data elements	The EMS (customer) inputs the 5 Minute Pricing Signal and creates Data elements for Device Commands	EMS (customer)	EMS (customer)	Data Elements for Device Commands	Creates commands from the customers preferences	
1.17 A.1		EMS (customer)	EMS (customer) sends Data elements for Device Commands	EMS (customer) sends Data Elements for Device Commands to In-Home Display Radio	EMS (customer)	IHD Radio	Data Elements for Device Commands for In-Home Display		
1.17 A.1.1		IHD Radio	IHD Radio receives the signal and sends a Communications Acknowledgement	IHD Radio receives the signal and sends a Communications Acknowledgement to the EMS	IHD Radio	EMS (customer)	Communications Acknowledgement		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.17 A.2		IHD Radio	IHD (In-Home Display) sends Data Elements	IHD (In-Home Display) Radio sends Data Elements for Device Commands to In-Home Display	IHD Radio	IHD (In-Home Display)	Data Elements for Device Commands for In-Home Display		
1.17 A.3		IHD (In-Home Display)	IHD (In-Home Display) displays Data Elements	IHD (In-Home Display) displays Data Elements for Device Commands	IHD (In-Home Display)	IHD (In-Home Display)	Data Elements for Device Commands		
1.17 B.1		EMS (customer)	EMS (customer) sends Data Elements for Device Commands	EMS (customer) sends Data Elements for Device Commands to PCT Radio	EMS (customer)	PCT Radio	Data Elements for Device Commands		
1.17 B.1.1		PCT Radio Radio	PCT Radio Radio receives the signal and sends a Communications Acknowledgement	PCT Radio Radio receives the signal and sends a Communications Acknowledgement to the EMS	PCT Radio	EMS (customer)	Communications Acknowledgement		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.17 B.2		PCT Radio	PCT Radio sends Data Elements for Device Commands	PCT Radio sends Data Elements for Device Commands to the PCT (Programmable Control Thermostat)	PCT Radio	PCT (Programmable Control Thermostat)	Data Elements for Device Commands	Cycling vs. temperature control - ???	
1.17 B.3		PCT (Programmable Control Thermostat)	PCT (Programmable Control Thermostat) functions	PCT (Programmable Control Thermostat) functions accordingly	PCT (Programmable Control Thermostat)	PCT (Programmable Control Thermostat)	Data Elements for Device Commands		
1.17 C.1		EMS (customer)	EMS (customer) sends Data Elements for Device Commands	EMS (customer) sends Data Elements for Device Commands to Smart Appliances Radio	EMS (customer)	Smart Appliances Radio	Data Elements for Device Commands		
1.17 C.1. 1		Smart Appliances Radio	Smart Appliance Radio receives the signal and sends a Communications Acknowledgement	Smart Appliance Radio receives the signal and sends a Communications Acknowledgement to the EMS	Smart Appliances Radio	EMS (customer)	Communications Acknowledgement		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.17 C.2		Smart Appliance Radio	Smart Appliance Radio sends Data Elements for Device Commands	Smart Appliance Radio sends Data Elements for Device Commands to Smart Appliance Device Controller	Smart Appliance Radio	Smart Appliance Device Controller	Data Elements for Device Commands		
1.17 C.3		Smart Appliance Radio	Smart Appliance Device Controller responds accordingly	Smart Appliance Device Controller responds accordingly	Smart Appliance Device Controller	Smart Appliance Device Controller	Data Elements for Device Commands		
1.17 D.1		EMS (customer)	EMS (customer) sends Data Elements for Device Commands	EMS (customer) sends Data Elements for Device Commands to the Load Control Switch Radio	EMS (customer)	Load Control Switch Radio	Data Elements for Device Commands		
1.17 D.1. 1		Load Control Switch Radio	Load Control Switch Radio receives the signal and sends a Communications Acknowledgement	Load Control Switch Radio receives the signal and sends a Communications Acknowledgement to the EMS	Load Control Switch Radio	EMS (customer)	Communications Acknowledgement		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.17 D.2		Load Control Switch Radio	Load Control Switch Radio sends Data Elements for Device Commands	Load Control Switch Radio sends Data Elements for Device Commands to Load Control Switch Device Controller	Load Control Switch Radio	Load Control Switch Device Controller	Data Elements for Device Commands		
1.17 D.3		Load Control Switch Radio	Load Control Switch Device Controller responds accordingly	Load Control Switch Radio responds accordingly	Load Control Switch Radio	Load Control Switch Radio	Data Elements for Device Commands		
1.17 E.1		EMS (customer)	EMS (customer) sends Data Elements for Device Commands	EMS (customer) sends Data Elements for Device Commands to EVSE Radio	EMS (customer)	EVSE Radio	Data Elements for Device Commands		
1.17 E.1. 1		EVSE Radio	EVSE Radio receives the signal and sends a Communications Acknowledgement	EVSE Radio receives the signal and sends a Communications Acknowledgement to the EMS	EVSE Radio	EMS (customer)	Communications Acknowledgement		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.17 E.2		EVSE Radio	EVSE Radio sends Data Elements for Device Commands	EVSE Radio sends Data Elements for Device Commands to EVSE (Electric Vehicle Supply Equipment)	EVSE Radio	EVSE (Electric Vehicle Supply Equipment)	Data Elements for Device Commands		
1.17 E.3		Electric Vehicle Supply Equipment)	EVSE (Electric Vehicle Supply Equipment) responds accordingly	EVSE (Electric Vehicle Supply Equipment) responds accordingly	EVSE (Electric Vehicle Supply Equipment)	EVSE (Electric Vehicle Supply Equipment)	Data Elements for Device Commands		
1.18		EMS (customer)	EMS (customer) delivers Communications Acknowledgements	EMS (customer) delivers Communications Acknowledgements to NIC - ESI	EMS (customer)	NIC - ESI	Communications Acknowledgements		
1.19		NIC - ESI	NIC - ESI collects and delivers Communications Acknowledgements	NIC - ESI collects and delivers Communications Acknowledgements to NIC - ESP	NIC - ESI	NIC - ESP	Communications Acknowledgements		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.20.1		NIC - ESP	NIC - ESP delivers Communications Acknowledgements	NIC - ESP delivers Communications Acknowledgements to the AMI Network	NIC - ESP	AMI Network	Communications Acknowledgements	Use AMI Network Use Case Scenario Smart Meter ESP to AMI Head End	
1.20.2		AMI Network	AMI Network delivers Communications Acknowledgements	AMI Network delivers Communications Acknowledgements to the AMI Head End	AMI Network	AMI Head End	Communications Acknowledgements	Use AMI Network Use Case Scenario Smart Meter ESP to AMI Head End	

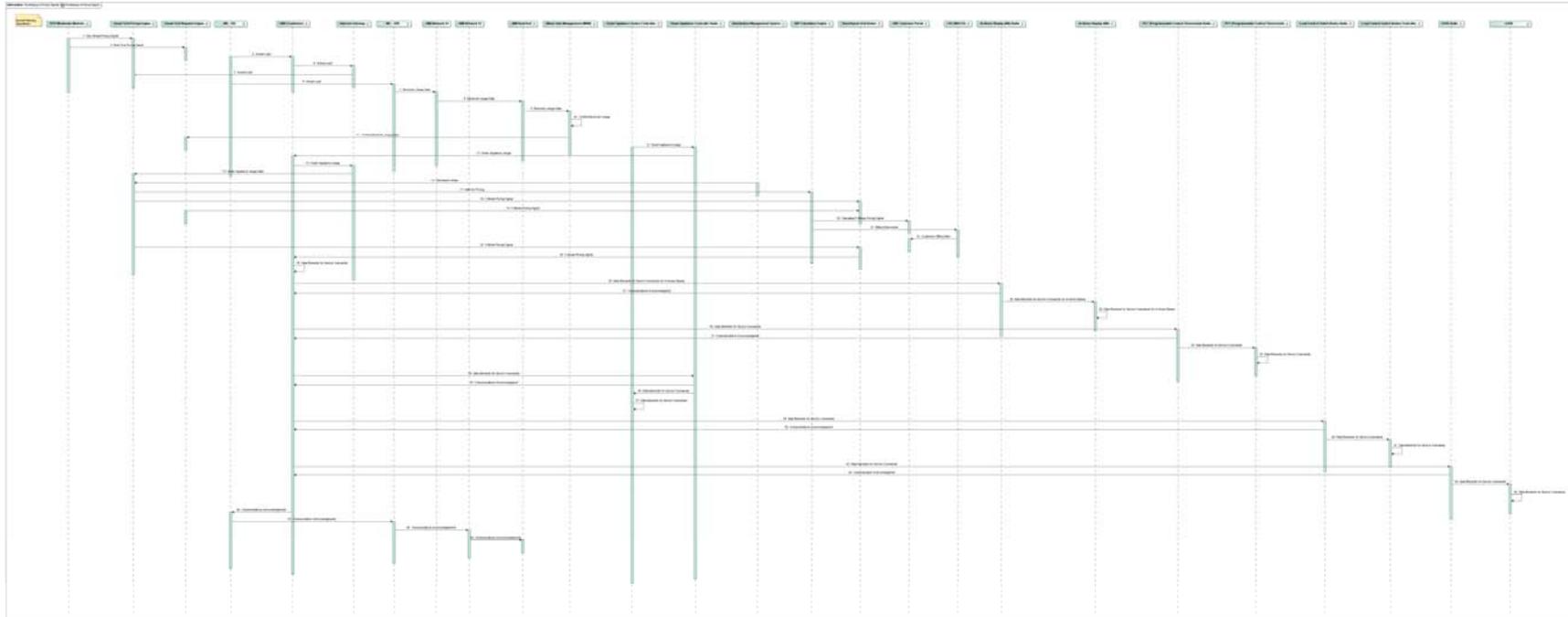
2.1.3 Post-conditions and Significant Results

<i>Actor/Activity</i>	<i>Post-conditions Description and Results</i>

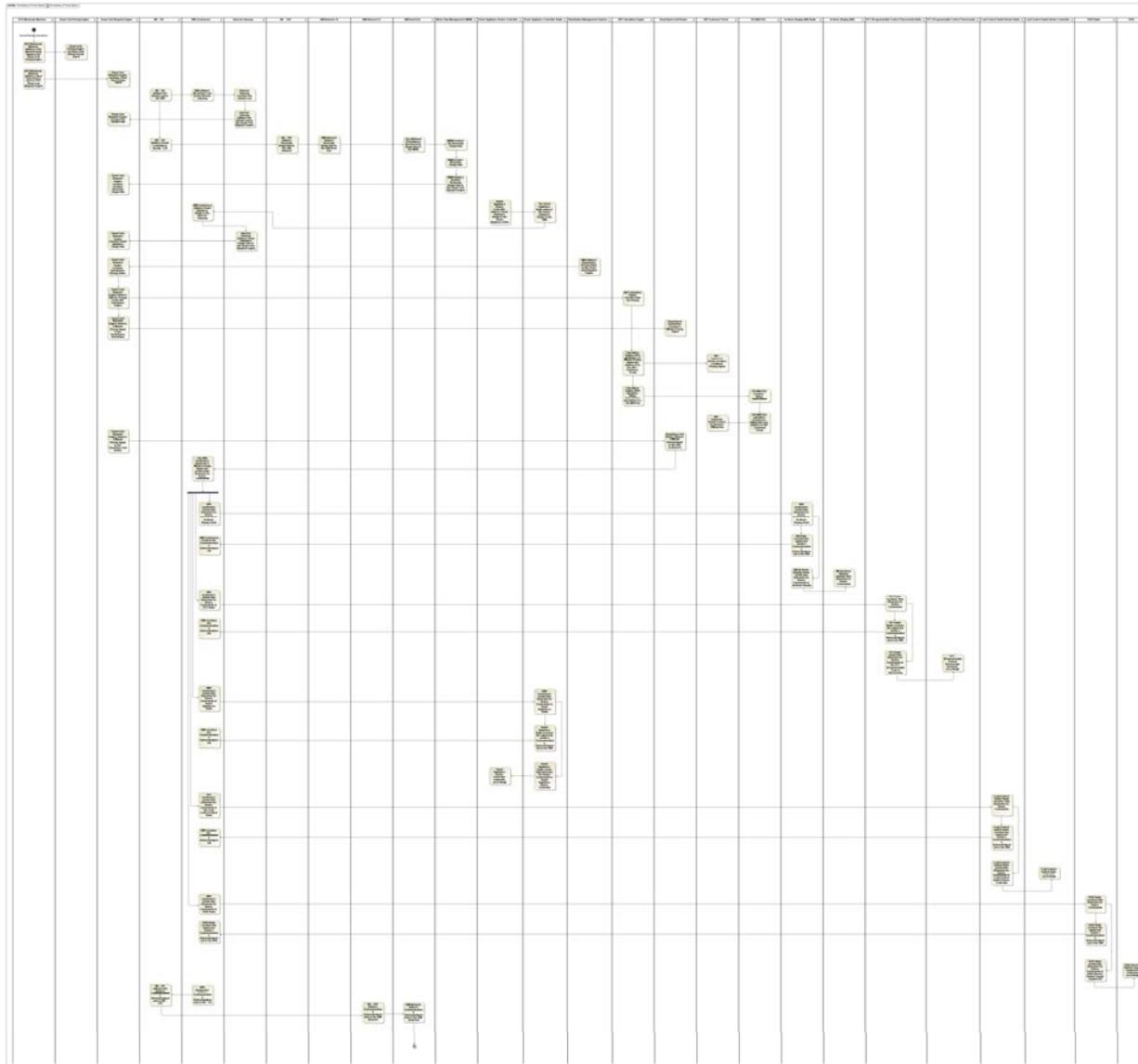
2.2 Architectural Issues in Interactions

Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number. Double click on the embedded excel file – record the changes and save the excel file (this updates the embedded attachment).

2.3 Diagrams



Developing a Pricing Signal Sequence Diagram



Developing a Pricing Signal Activity Diagram

3 Auxiliary Issues

3.1 References and contacts

ID	Title or contact	Reference or contact information
[1]		

3.2 Action Item List

ID	Description	Status
[1]		

3.3 Revision History

No	Date	Author	Description
1.1	3/24/2010	Brian D. Green	Original Use Case
1.2	3/24/2010	J.R. Cote	Update Actors lists
1.3	3/25/2010	John Simmins	Update Narrative
1.4	3/30/2010	Brian D. Green	Use Case Diagrams and clean-up
2.0	4-11-2010	John Simmins	Actor clean-up.
3.0	5-12-2010	Brian D. Green	Revisions and add diagrams